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Rob Anderson
C/O BLAKELY, SOFOLOFF, TAYLOR & ZAFMAN LLP
12400 Wilshire Boulevard
Seventh Floor
Los Angeles, CA 90025

EXAMINER

ANYA, CHARLES E

ART UNIT PAPER NUMBER

2126

DATE MAILED: 03/11/2004

12

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/450,381

Applicant(s)

SHAH ET AL.

Examiner

Charles E Anya

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 December 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-30 are pending in this application.
2. Please furnish the office with the references (PCI Local Bus Specification, Revision 2.1 by PCI Special Interest Group (SIG) on June 1, 1995, Next Generation Input/Output (NGIO) Specification by the NGIO forum on March 26, 1999 and Next Generation I/O Link Architecture Specification: HCA Specification, Revision 1.0 by NGIO Forum on July 20, 1999) cited on pages 2, 8 and 9 respectively.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
4. **Claims 9-13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**
5. Claim 9 recites the limitation "each controller driver" in lines 18 – 19. There is insufficient antecedent basis for this limitation in the claim.

For the purpose of this office action the examiner would assume that the phrase "each controller driver" implies "each I/O controller driver".

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. **Claims 1,2,4,14,15,20 and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Pat. No. 5,644,712 to Coscarella et al.**

8. As to claim 1, Coscarella teaches a host coupled to a cluster fabric including one or more fabric-attached I/O controllers, comprising: a processor, a memory coupled to the processor and an operating system provided with an I/O bus abstraction to report multiple paths to a target fabric-attached I/O controller (figures 1 and 3A/B Col. 5 Ln. 14 – 67, Col. 6 Ln. 1 – 49) and the operating system that directs service requests between the host and the target fabric-attached I/O controller in response to the multiple paths (figure 5 Col. 7 Ln. 24 – 63).

9. As to claim 2, Coscarella teaches the host as claimed in claim 1, wherein said operating system further comprises: a kernel; and a fabric bus driver to provide said I/O bus abstraction to the kernel for the cluster fabric to report the multiple paths to the target fabric-attached I/O controller (figure 5 (IOP 118) Col. 7 Ln. 24 – 63).

10. As to claim 4, Coscarella teaches the host as claimed in claim 2, further comprising a host-fabric adapter provided to interface the host to the cluster fabric (figure 1 Col. 1 Ln. 21 – 67).

11. As to claim 14, Coscarella teaches a cluster comprising: a cluster fabric, a host including an operating system coupled to the cluster fabric, an I/O controller attached to the cluster fabric (figures 1 Col. 5 Ln. 21 – 67), and a fabric manager coupled to the cluster fabric, for assigning I/O controllers in the cluster fabric to at least said host and sending messages to said host indicating that the I/O controller has been assigned (figure 9 col. 13 Ln. 20 – 67, Col. 14 Ln. 1 – 14), wherein said operating system including a fabric bus driver provided to report multiple paths to a target fabric-attached I/O controller and the operating system to direct service requests between the host and the target fabric-attached I/O controller in response to the response to the multiple paths (figures 1 and 3A/B Col. 5 Ln. 14 – 67, Col. 6 Ln. 1 – 49, figure 5 Col. 7 Ln. 24 – 63).

12. As to claim 15, see the rejection of claim 2 above.

13. As to claim 20, Coscarella teaches the cluster as claimed in claim 14, wherein said fabric manager comprises: fabric services to detect the connection or presence of the target fabric-attached I/O controller and to assign a network address to the target fabric-attached I/O controller; and an I/O controller manager coupled to the fabric

services to assign the target fabric-attached I/O controller to said host and to send messages to said host indicating that the target fabric-attached I/O controller has been assigned (figure 9 Col. 13 Ln. 20 – 67).

14. As to claim 21, Coscarella teaches a computer usable medium having computer readable program code embodied therein for use in a host system to report multiple paths to a target fabric-attached I/O controller via a cluster fabric, said computer readable program code means when executed, cause a computer to: create and report multiple paths from a host to a target fabric-attached I/O controller via the cluster fabric; and enable reporting the multiple paths to the target fabric-attached I/O controller and direct service requests between the host and the target fabric-attached I/O controller in response to the multiple paths (figures 1 and 3A/B Col. 5 Ln. 14 – 67, Col. 6 Ln. 1 – 49, figure 5 Col. 7 Ln. 24 – 63).

Claim Rejections - 35 USC § 103

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. Claims 5-8,17-19 and 22-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 5,644,712 to Coscarella et al. in view of U.S. Pat. No. 6,594,698 B1 to Chow et al.

17. As to claim 5, Coscarella as modified in claim 4 is silent with reference to the host as claimed in claim 4, further comprising a fabric adapter device driver provided to control operation of the host-fabric adapter.

18. Chow teaches the host as claimed in claim 4, further comprising a fabric adapter device driver provided to control operation of the host-fabric adapter (Fibre Channel Interface Low Level Driver 506 Col. 10 Ln. 39 – 67).

19. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Chow and Coscarella in order to determine the status of a host adapter (Chow reference Col. 10 Ln. 45 – 47).

20. As to claim 6, Coscarella as modified in claim 5 is silent with reference to the host as claimed in claim 5, wherein said fabric bus driver creates a separate device object for each port of the host-fabric adapter that can be used to communicate with the target fabric-attached I/O controller and establish the multiple paths to the target fabric-attached I/O controller.

21. Chow teaches the host as claimed in claim 5, wherein said fabric bus driver creates a separate device object for each port of the host-fabric adapter that can be used to communicate with the target fabric-attached I/O controller and establish the

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multiple paths to the target fabric-attached I/O controller (“...IOB...” Col. 10 Ln. 62 – 67, Col. 11 Ln. 1 – 29).

22. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Chow and Coscarella in order to describe a single request (Chow reference Col. 11 Ln. 27 – 29).

23. As to claim 7, Coscarella teaches the host as claimed in claim 5, wherein said multiple paths are utilized for load balancing I/O requests and/or for fault tolerance when one or more paths to the target fabric-attached I/O controller fail (“...busy...” figure 5 Col. 8 Ln. 1 – 37).

24. As claim 8, Coscarella as modified in claim 5 is silent with reference to the host as claimed in claim 5, wherein said fabric bus driver creates a single device object for the target fabric-attached I/O controller even if multiple ports of the host-fabric adapter can be used to communicate with the target fabric-attached I/O controller.

25. Chow teaches the host as claimed in claim 5, wherein said fabric bus driver creates a single device object for the target fabric-attached I/O controller even if multiple ports of the host-fabric adapter can be used to communicate with the target fabric-attached I/O controller (“...IOB...” Col. 10 Ln. 62 – 67, Col. 11 Ln. 1 – 29).

26. It would have been obvious to one of ordinary skill in the art at time the invention was made to combine the teachings of Chow and Coscarella in order to describe a single request (Chow reference Col. 11 Ln. 27 – 29).

27. As to claim 17, see the rejection of claim 6.

28. As to claim 18, see the rejection of claim 7.

29. As to claim 19, see the rejection of claim 8.

30. As to claim 22, Coscarella teaches a method of initializing a host to report multiple paths to a target agent via a cluster fabric, comprising: enabling the local I/O bus driver to identify any local I/O controllers connected to a corresponding local I/O bus/enabling the fabric bus driver to identify any fabric-attached I/O controllers assigned to the host, and report the identified local I/O controllers connected to the local I/O bus and the identified fabric-attached I/O controllers to the I/O manager (figure 9 Col. 13 Ln. 20 – 67), enabling the fabric bus driver to create and report multiple paths to a target fabric-attached I/O controller via the cluster fabric (figure 3A/B Col. 5 Ln. 14 – 67, Col. 1 – 61) and directing service requests between the host and the target fabric-attached I/O controller in response to the multiple path (figure 5 Col. 7 Ln. 24 – 63).

31. Coscarella is silent with reference to loading an operating system kernel into a memory, loading an I/O manager into the memory, loading a local I/O bus driver and a fabric bus driver providing a local I/O bus abstraction for the cluster fabric into the memory and loading an I/O controller driver into the memory for each reported I/O controller.

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32. Chow teaches loading an operating system kernel into a memory, loading an I/O manager into the memory (Col. 6 Ln. 45 – 59), loading a local I/O bus driver and a fabric bus driver providing a local I/O bus abstraction for the cluster fabric into the memory and loading an I/O controller driver into the memory for each reported I/O controller (“...cs...” Col. 6 Ln. 38 – 49, Col. 9 Ln. 10 – 18, Col. 12 Ln. 48 – 64, Col. 14 Ln. 1 – 13).

33. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Chow and Coscarella in order to perform I/O operation (Chow reference Col. 6 Ln. 45 – 59).

34. As to claim 23, Coscarella teaches the method as claimed in claim 22, wherein said identified local I/O controllers connected to the local I/O bus and said identified fabric-attached I/O controllers to the I/O manager are reported using a common set of procedures or commands (Col. 5 Ln. 53 – 67).

35. As to claim 24, Coscarella teaches a method of initializing a host to report multiple paths to a target agent via a cluster fabric comprising: enabling the local I/O bus driver to identify any local I/O controllers connected to a corresponding local I/O bus, enabling the fabric bus driver to identify any fabric-attached I/O controllers assigned to the host, identifies all paths to a target fabric-attached I/O controller, and report all multiple paths to a target fabric-attached I/O controller via the cluster fabric and directing service requests between the host and the target fabric-attached I/O

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controller in response to the multiple paths (figure 3A/B Col. 5 Ln. 14 – 67, figure 5 Col. 7 Ln. 24 – 67).

36. Coscarella is silent with reference to loading an operating system kernel into a memory/loading an I/O manager into the memory, loading a local I/O bus driver and a fabric bus driver providing a local I/O bus abstraction for the cluster fabric into the memory and create one instance of an I/O controller driver stack for each path to the target fabric-attached I/O controller (“...cs...” Col. 6 Ln. 38 – 49, Col. 9 Ln. 10 – 18, Col. 12 Ln. 48 – 64, Col. 14 Ln. 1 – 13).

37. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Chow and Coscarella in order to perform I/O operation (Chow reference Col. 6 Ln. 45 – 59).

38. As to claims 25 and 29, see the rejection of claim 22 above.

39. As to claim 26, see the rejection of claim 23 above.

40. As to claim 27, see the rejection of claim 6 above.

41. As to claim 28, see the rejection of claim 7 above.

42. As to claim 30, see the rejection of claim 8 above.

43. Claims 3,9-13 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 5,644,712 to Coscarella et al. in view of U.S. Pat. No. 6,209,023 B1 to Dimitroff et al.

44. As to claim 3, Coscarella as modified teaches the host as claimed in claim 2, wherein said fabric bus driver presents the cluster fabric to the kernel as a local I/O bus, and presents one or more target fabric-attached I/O controllers to the kernel as local I/O controllers.

45. Dimitroff teaches the host as claimed in claim 2, wherein said fabric bus driver presents the cluster fabric to the kernel as a local I/O bus, and presents one or more target fabric-attached I/O controllers to the kernel as local I/O controllers (figure 1 Col. 5 Ln. 18 – 67, Col. 6 Ln. 1 – 37).

46. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Dimitroff and Coscarella because Dimitroff's teaching would improve the throughput of Coscarella's system by facilitating disk drive access.

47. As to claim 9, Coscarella teaches an operating system for a host coupled to a cluster fabric including one or more fabric attached I/O controllers, comprising: a kernel (, one or more I/O controller drivers operatively coupled to the kernel (figure 1 Col. 1 Ln. 21 – 67), a fabric bus driver operatively coupled to the I/O manager to provide an I/O bus abstraction to the I/O manager to report multiple paths to a target fabric-attached

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I/O controller and the operating system to direct service requests between the host and the target fabric-attached I/O controller in response to the multiple paths (figures 1 and 3A/B Col. 5 Ln. 14 – 67, Col. 6 Ln. 1 – 49, figure 5 Col. 7 Ln. 24 – 63).

48. Coscarella is silent with reference to one or more I/O controller drivers operatively coupled to the kernel, each controller driver specific for a specific type of I/O controller.

49. Dimitroff teaches one or more I/O controller drivers operatively coupled to the kernel, each controller driver specific for a specific type of I/O controller (figure 1 Col. 5 Ln. 18 – 67, Col. 6 Ln. 1 – 55).

50. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Dimitroff and Coscarella because Dimitroff's teaching would improve the throughput of Coscarella's system by facilitating disk drive access.

51. As to claim 10, Coscarella as modified is silent with reference to the operating system as claimed in claim 9, wherein said fabric bus driver appears to the I/O manager as a local I/O bus driver.

52. Dimitroff teaches the operating system as claimed in claim 9, wherein said fabric bus driver appears to the I/O manager as a local I/O bus driver (figure 1 Col. 5 Ln. 18 – 52).

53. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Dimitroff and Coscarella because

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Dimitroff's teaching would improve the throughput of Coscarella's system by facilitating disk drive access.

54. As to claim 11, see the rejection of claim 10 above.

55. As to claim 12, see the rejection of claim 9 above.

56. As to claim 13, Dimitroff teaches the operating system as claimed in claim 12, wherein said local I/O bus drivers and said fabric bus driver communicate with the I/O manager using a common set of procedures (Col. 5 Ln. 53 – 67).

57. As to claim 16, Coscarella teaches the cluster as claimed in claim 14, further comprising a host-fabric adapter provided to interface the host to the cluster fabric figure 1 Col. 1 Ln. 21 – 67).

58. Coscarella as modified is silent with reference to a fabric adapter device driver provided to control operation of the host-fabric adapter.

59. Dimitroff teaches a fabric adapter device driver provided to control operation of the host-fabric adapter (figure 1 Col. 5 Ln. 18 – 67).

60. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Dimitroff and Coscarella because Dimitroff's teaching would improve the throughput of Coscarella's system by facilitating disk drive access.

Response to Arguments

61. Applicant's arguments with respect to claims 1-30 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

62. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles E Anya whose telephone number is (703) 305-3411. The examiner can normally be reached on M-F (8:30-6:00) First Friday off.

The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Charles E Anya
Examiner
Art Unit 2126

cea


MENG-AL T. AN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100